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Clinical Judgment in Diagnostic Errors: Let's Think About Thinking

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When someone says they had to "make a judgment call," you probably assume that the person tried to make the best possible decision based on the available information. That is, the person assessed the situation, considered relevant data, and came to a conclusion based on factual information and their own opinion, knowledge, and experience.

The term "clinical judgment" refers to a similar process that healthcare providers use to assess and diagnose patients. They use information gathered from patients, observation, and their personal experience, knowledge, and critical-thinking skills to inform clinical decision-making.[1]

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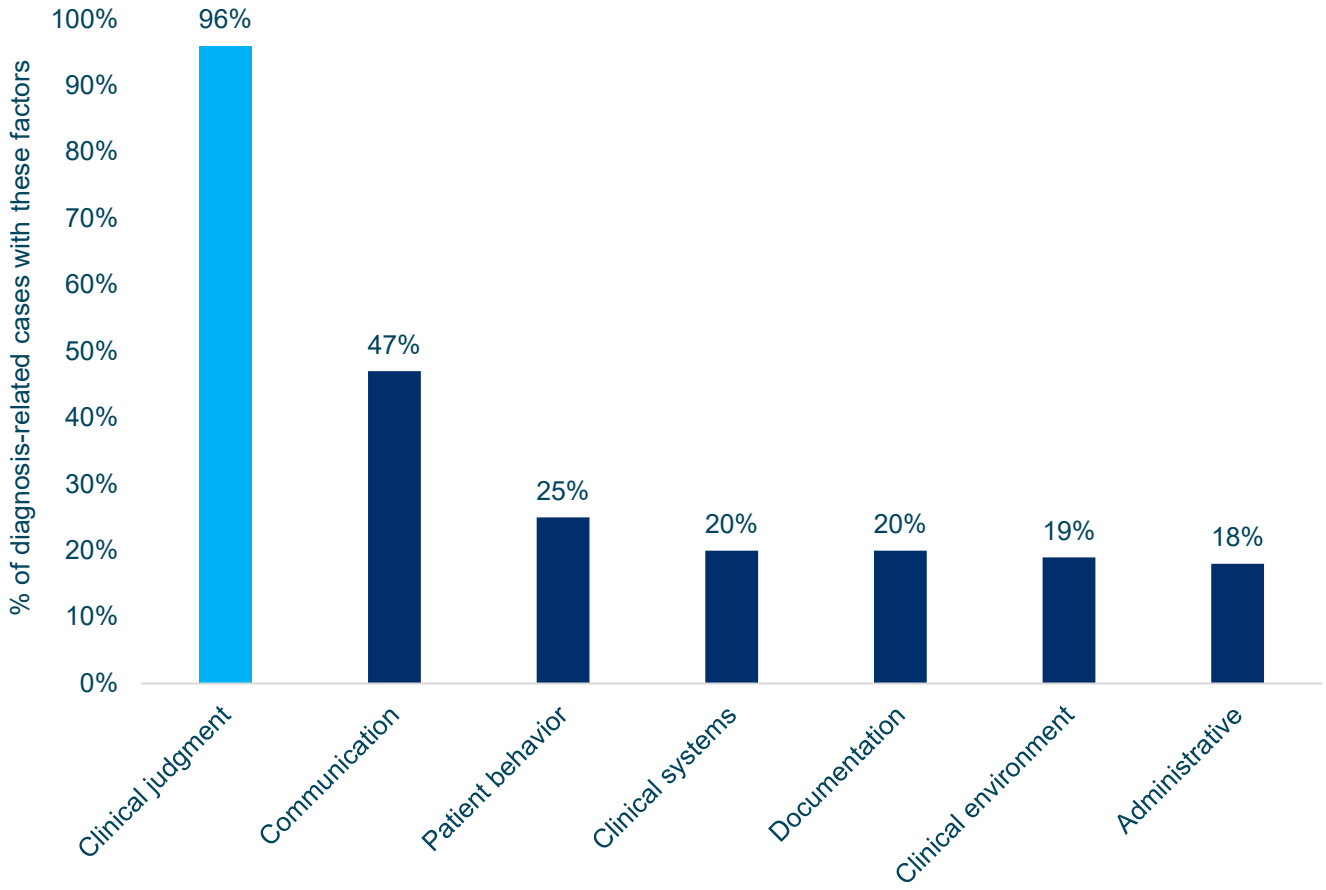
Clinical judgment is a complex process that involves various cognitive functions, so it's easy to understand why it is a driving force in diagnostic errors and diagnosis-related malpractice cases. In fact, MedPro data show that clinical judgment is a contributing factor in 96 percent of diagnosis-related cases (Figure 1) — a rate double that of the next top contributing factor (communication).

The prevalence of clinical judgment issues is almost certainly tied to their complexity and the fact that they tend to be less amenable to straightforward fixes than other contributing factors, such as system failures.

Figure 1. Top Contributing Risk Factors in Diagnosis-Related Malpractice Cases



Source: MedPro Group diagnosis-related cases, opened 2013–2022. **Note:** Total exceeds 100 percent because more than one factor generally is associated with each case.

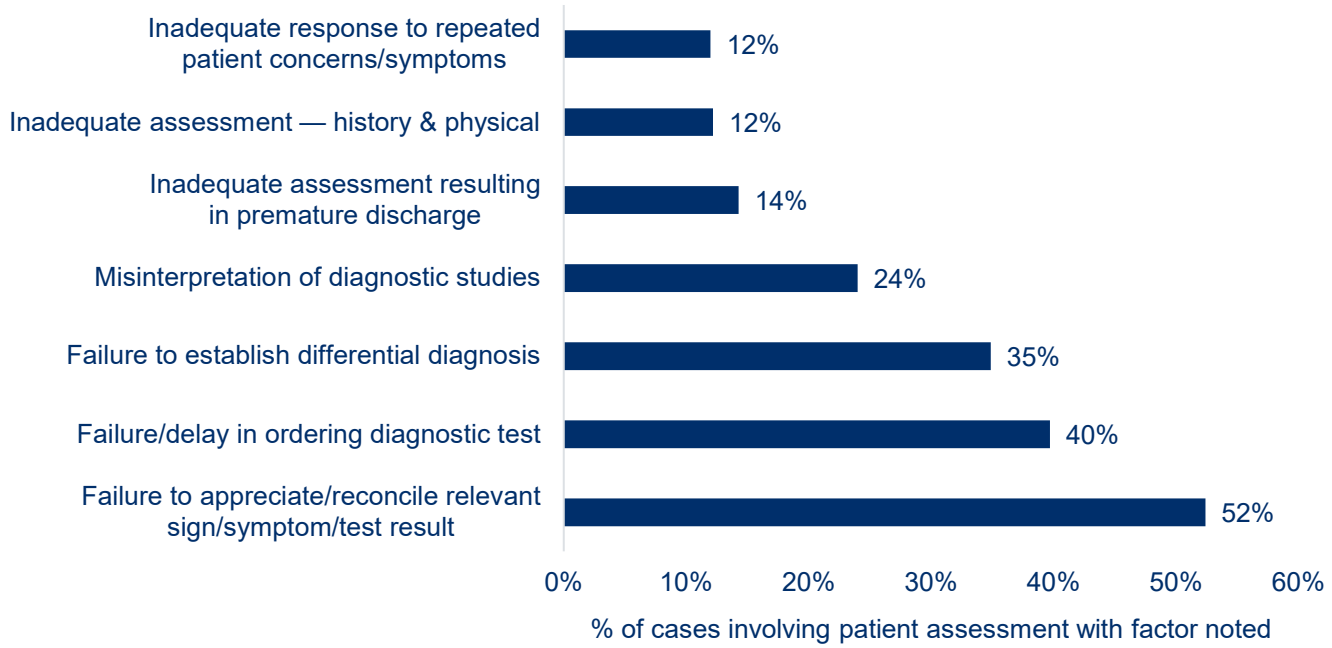
This article will (a) take a closer look at the various clinical judgment issues that contribute to diagnosis-related malpractice cases, (b) examine how cognition shapes clinical reasoning and decision-making, (c) discuss how cognitive errors in judgment can occur during the diagnostic process, and (d) explore proposed solutions and risk strategies for managing lapses in clinical judgment.

Clinical Judgment in the Context of Diagnosis-Related Malpractice Cases

The concept of clinical judgment as a contributing factor in diagnosis-related malpractice cases is difficult to grasp because of its enormity. Simply stated, clinical judgment is a broad category that includes various clinical aspects, such as assessing patients, obtaining consults/referrals, monitoring patients (e.g., response to treatment), and selecting and managing therapy (e.g.,

choosing an appropriate care plan or medications). Among these clinical areas, patient assessment issues surface as the top clinical judgment concern. Figure 2 offers a more detailed explanation of the failures that occur related to patient assessment.

Figure 2. Top Issues Associated With Patient Assessment in Diagnosis-Related Cases Involving Clinical Judgment



Source: MedPro Group diagnosis-related cases, opened 2013–2022. **Note:** Total exceeds 100 percent because more than one factor generally is associated with each case.

Breaking down these categories and subcategories helps define the ways in which clinical judgment errors contribute to malpractice cases, but it doesn't explain why these circumstances happen. What causes these missteps and lapses in judgment? Understanding the clinical reasoning and decision-making processes can help explain why clinical judgment so frequently contributes to diagnostic errors.

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Clinical Reasoning and Decision-Making

The National Academies of Sciences, Engineering, and Medicine's (NASEM's) influential report *Improving Diagnosis in Health Care* explains that "Clinical reasoning occurs within clinicians'

minds . . . and involves judgment under uncertainty, with a consideration of possible diagnoses that might explain symptoms and signs, the harms and benefits of diagnostic testing and treatment for each of those diagnoses, and patient preferences and values."[2]

Much of the literature focusing on diagnostic errors and clinical reasoning recognizes the dual decision-making model, which consists of two reasoning systems as the basis for clinicians' diagnostic process (see table). System 1 involves arranging patient data into a pattern and arriving at a working diagnosis based on past experience, knowledge, and/or intuition. System 2 involves more cognitive workload and resources, and it often is associated with cases that are complex or novel.[3]

Dual Decision-Making Model	
System 1	**System 2**
• Automatic • Intuitive • Reflexive • Nonanalytic	• Analytic • Slow • Reflective • Deliberate

System 1 and System 2 are not mutually exclusive, and clinicians tend to use both depending on the circumstances. These systems also may occur in tandem and intervene with or override each other as situations evolve.[4]

Research suggests that most clinical work involves System 1 reasoning, particularly as clinicians gain more experience and knowledge — however, both systems of reasoning are vulnerable to cognitive errors.[5]

Cognitive Errors

Many types of cognitive errors can occur during the diagnostic process. Describing each is beyond the scope of this article; however, errors in clinical reasoning can arise from several sources, including knowledge deficits, faulty heuristics, and affective influences/situativity.[6]

Knowledge Deficits

Knowledge gaps and clinician inexperience might seem like logical causes of diagnostic errors. Thus, a reasonable assumption is that younger, less experienced healthcare providers are at greater risk of diagnostic pitfalls than experienced clinicians. Sometimes this is true and can show how System 2 clinical reasoning is susceptible to cognitive errors. Even with a slow,

analytic thought process, "clinicians with an inadequate knowledge base may not have the information necessary to make a correct decision."[7]

However, inexperience aside, most cognitive errors are not related to knowledge deficits; rather, they are the result of errors in data collection, data integration, and data verification, with "data" referring to clinical information obtained during the provider–patient encounter.[8]

Further, many diagnostic errors are associated with common diseases and conditions, suggesting that other problems with clinical reasoning — such as faulty heuristics, cognitive biases, and affective influences/situativity — are the likely culprit (as opposed to an inadequate knowledge base).

Faulty Heuristics and Cognitive Biases

The term "heuristics" refers to mental shortcuts in the thought process that help conserve time and effort. These shortcuts are an essential part of thinking, but they also are prone to errors. Cognitive biases occur when heuristics lead to faulty decision-making.[9] Some common biases included anchoring, availability, overconfidence, and context effect.

Anchoring

Anchoring refers to a tendency to "anchor" to, or rely too much on, a particular piece of information — often the initial information obtained, the first symptom, or the first lab abnormality. Anchoring is closely related to several other biases, including:

- Under-adjustment, which is the inability to revise a diagnosis based on additional clinical data
- Premature closure, which is the termination of the data-gathering process (e.g., patient history, family history, and medication list) before all of the information is known
- Primacy effect, which is the tendency to show bias toward primary or initial information
- Confirmation bias, which is the tendency to focus on information that confirms an initial diagnosis or to manipulate information to fit preconceptions

Availability

Availability bias can occur if a clinician considers a diagnosis more likely because it easily comes to mind. Past experience and recent, frequent, or prominent cases can all play a role in availability bias.

For example, a clinician who has recently diagnosed an elderly patient with dementia might be more likely to make the same diagnosis in another elderly patient who has signs of confusion and memory loss — when, in fact, the patient's symptoms might be indicative of another problem, such as vitamin B12 deficiency.

Overconfidence

Overconfidence bias can occur when clinicians overestimate their own knowledge and ability, which can prevent them from gathering and assessing ample information. Overconfidence might result from a lack of feedback related to diagnostic accuracy, which in turn may lead to an overestimation of diagnostic precision. To this point, overconfidence might increase as a clinician's level of expertise and experience increases.[10]

Framing Effect

Framing effect can occur if a clinician misinterprets information or a situation based on the way in which it is presented. For example, if a patient presents with chest pain and has a known family history of heart disease, a clinician might interpret the pain as a likely symptom of a heart attack, when in fact the cause is a broken rib.

Affective Influences/Situativity

Whereas cognitive biases are lapses in thinking, the term "affective influences" refer to emotions and feelings that can sway clinical reasoning and decision-making.[11] For example, preconceived notions and stereotypes about a patient might influence how a healthcare provider views the patient's signs and symptoms. If the patient has a history of substance abuse, for instance, the provider might view reports of pain as drug-seeking behavior. Although this impulse might be accurate, the patient could potentially have a legitimate clinical issue.

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Additionally, negative feelings about patients might cause providers to consciously or subconsciously blame patients for their symptoms or conditions — a bias called attribution error. For example, a provider may attribute a patient's obesity to laziness or general disregard for health and wellness. Similarly, patients who do not follow their care plans might be viewed as difficult — in reality, though, these decisions might be related to financial issues or other causes.

Elderly patients also might be vulnerable to attribution errors because clinicians have a tendency to attribute these patients' symptoms to advancing age, rather than exploring other potential causes.[12] Similarly, a type of bias called diagnostic overshadowing occurs when clinicians attribute a patient's symptoms to an existing condition, such as a behavioral health issue or disability.[13]

Positive feelings about patients also can affect diagnostic decisions. In outcome bias, for example, a provider may overlook certain clinical data in order to select a diagnosis with better outcomes. By doing so, the provider is placing more value on what they hope will happen, rather than what might realistically happen.

Beyond positive and negative feelings about patients, clinician and patient characteristics — such as age, gender, socioeconomic status, and ethnicity — also can affect the diagnostic process. For example, research has shown that various implicit and explicit biases related to race, ethnicity, and gender can affect pain management decisions.[14]

A variety of other factors also can affectively influence a clinician's reasoning, such as:

- Environmental circumstances, such as high levels of noise or frequent interruptions
- Sleep deprivation, irritability, fatigue, and stress
- Mood disorders, mood variations, and anxiety disorders[15]

More recent research continues to expand the concepts of cognition and clinical reasoning by viewing them through the lens of situativity. "Situativity" is an umbrella term that describes a series of cognitive theories that examine clinical judgment and reasoning in the context of the situations in which they occur.

These theories move "beyond individual beliefs and knowledge construction to consider those present during the encounter (e.g., the patient and his/her family members, other health care

workers, learners), the multiple environmental inputs (e.g., appointment length, artifacts such as electronic health record [EHR] functionality, culture), and their dynamic interactions."[16]

The complex interaction between cognitive biases, affective influences, and clinical context can have a profound effect on clinical reasoning and decision-making, which in turn can lead to various lapses in clinical judgment. The case studies on the following pages provide two examples of how cognitive errors can result in diagnostic missteps.

Case Study 1: Medical

A 34-year-old male presented to his primary care doctor with sternal pain after lifting a boat in his backyard. The pain increased when the patient raised his arms. An ECG was ordered, and the results were negative. The patient was not referred for cardiac enzyme testing because the doctor decided that muscle strain was the cause of the patient's symptoms. The doctor cleared the patient to go on vacation. Two days into his vacation, the patient died from a heart attack.

Discussion: This case offers a good example of anchoring bias. Knowing that the patient had recently lifted a boat, the doctor honed in on muscle strain as the likely cause of the patient's pain. The negative results from the ECG reinforced the narrow diagnostic focus. As a result, the doctor failed to order further testing and prematurely terminated the data-gathering process.

Further investigation of the patient's history would have revealed that the patient was a heavy smoker and drinker. He also had a family history of cardiovascular disease, and both his father and grandfather died in their early forties. An affective influence also might have been at play in this case; the doctor might have considered a cardiac condition less likely because of the patient's young age.

Case Study 2: Dental

A patient who had undergone radiation therapy for cancer of the soft palate presented to his general dentist for routine care. Because of severe xerostomia, the dentist and patient were unable to control the patient's caries. After multiple attempts to restore the severely compromised teeth, the dentist decided to remove the remaining mandibular teeth and insert a complete lower denture; however, he did not suggest any precautionary measures, such as hyperbaric oxygen, prior to the extractions.

After a series of denture adjustments, the soft tissue on both the right and left mandibular ridges did not heal, and the patient would periodically remove small pieces of bone. The patient returned to the general dentist at least seven times to complain about the discomfort, bone spicules, a foul odor in his mouth, and episodes of swelling.

After about 1 year, the general dentist referred the patient to an oral and maxillofacial surgeon (OMS). The surgeon developed a care plan for the patient that included hyperbaric oxygen treatments, removal of the remaining maxillary teeth, and repair of the mandibular defects. During the course of treatment, the OMS noticed that the mandible was fractured. External fixation and a bone graft were required to stabilize the fracture.

Discussion: Numerous clinical judgment lapses complicated this case and ultimately led to a malpractice lawsuit against the general dentist. The first was the issue of selecting and managing the patient's therapy. Prior to removing the mandibular teeth, the dentist did not recommend a hyperbaric oxygen protocol or other precautionary measures, despite the patient's medical history. Following the procedure, the patient presented on multiple occasions with issues, but the dentist failed to identify the underlying cause or recommend treatment. Finally, the delay in referring the patient to an OMS was alleged to have contributed to the patient's poor outcome.

A knowledge deficit also may have contributed to this case, as the dentist had limited experience with cases of this level of severity. Additionally, overconfidence might have been a factor in the dentist choosing to manage the case himself instead of providing an immediate referral.

Proposed Solutions

Although cognitive processes are well-studied, further research is needed to determine how best to prevent the flaws in clinical judgment that can lead to diagnostic errors. Numerous solutions have been proposed, including implementing strategies to improve teamwork, adjusting processes and workflows, using diagnostic aids, and exploring debiasing techniques.

NASEM's top recommendation in *Improving Diagnosis in Health Care* is facilitating better teamwork to strengthen the diagnostic process. This recommendation includes supporting an environment that is conducive to collaboration, providing technology that assists with communication, establishing measurable processes and feedback mechanisms, and engaging patients and their families in the diagnostic process.

NASEM's recommendation represents a major conceptual shift because it distributes diagnostic responsibility across the "diagnostic team" rather than placing responsibility solely on the treating clinician. As a result, the diagnostic team must have the knowledge, skills, resources, and competencies to support the diagnostic process. To this end, NASEM also recommends an increased emphasis on clinical reasoning and decision-making in medical education, including a strong focus on heuristics and biases.

The Diagnostic Team

To learn more about the concept of the diagnostic team, see MedPro's article *Safety in Numbers: Improving Diagnosis Through Teamwork*.

Other studies on diagnostic errors and clinical judgment suggest using evidence-based decision support systems, clinical guidelines, checklists, and clinical pathways to support the reasoning and decision-making processes. However, they note that although these tools can be useful, "unless they are well integrated in the workflow, they tend to be underused."[17]

Similarly, health information technology (IT) and artificial intelligence (AI) show promise in supporting diagnostic decision-making and potentially reducing errors; yet, many experts in healthcare and technology agree that these technologies have flaws, carry risks, and require more oversight and research.[18]

A variety of debiasing techniques also have been proposed as a way to address clinical judgment issues. Examples of these techniques include situational awareness and

metacognition, which can help healthcare providers think critically about their own thought processes and how biases might affect them.

Cognitive forcing functions also might be helpful; these strategies are designed to assist clinicians in self-monitoring decisions and avoiding potential diagnostic pitfalls.[19] Other techniques — such as perspective-taking, emotional regulation, and partnership-building — also can help reduce bias and promote empathy, humility, and patient-centered care.

Helpful Resource

The Society to Improve Diagnosis in Medicine's Clinical Reasoning Toolkit supports awareness and better understanding of diagnostic reasoning, cognitive psychology, and diagnostic errors. The toolkit includes information for clinicians, educators, researchers, and patients.

Although many of these techniques show promise, ongoing research is needed to evaluate their efficacy and to determine the feasibility of introducing them into busy clinical environments.

Risk Management Strategies

As researchers continue to explore long-term solutions to errors in clinical judgment, healthcare providers can proactively implement strategies to help mitigate risks associated with clinical reasoning, cognition, and decision-making. The following list offers suggestions for managing these risks within various practice settings:

- Update and review patients' medical histories, problem lists, medication lists, and allergy information at each visit. Make sure patients' health records reflect their most recent information.
- Consider using a checklist or template to guide taking each patient's medical history and performing a thorough physical exam. In a busy healthcare environment, checklists can help ensure consistency and prevent oversights.
- Perform complete patient assessments, including establishing differential diagnoses, considering appropriate diagnostic testing, and carefully reviewing test results.
- Engage patients and their families in the diagnostic process through education, access to health records, and opportunities to provide feedback. Encourage patients and families to be part of the diagnostic team.

- Work with healthcare leaders and providers in the organization to evaluate the benefit of using clinical pathways to standardize processes and support high-quality care. Determine how best to implement care pathways into workflow patterns.
- Consider using supportive health IT systems — such as clinical decision support, trigger algorithms, and EHR alerts — that can assist with the diagnostic process and improve collaboration among members of the diagnostic team.
- Incorporate a diagnostic review process into the workflow pattern. The review might include timeouts to (a) reflect on working diagnoses, (b) seek consultations, and/or (c) facilitate group decision-making to support clinical reasoning.
- Develop a written policy that outlines how disagreements in diagnosis and care among the diagnostic team will be managed, including the appropriate chain of command for escalating conflicts.
- Formalize procedures for overreads of diagnostic tests and imaging, peer review and quality improvement, use of diagnostic guidelines, handoffs of patient information both within and outside of the organization, and better access to patients' records.
- Be aware of common cognitive biases and affective influences and how they might negatively affect clinical judgment. Learn about various de-biasing techniques, such as situational awareness, metacognition, perspective-taking, emotional regulation, and partnership-building.
- Consider using structured tools or approaches to identify the types of diagnostic errors occurring in the practice and the root cause of the errors. Use this information to educate the clinical team and develop countermeasures to improve quality of care.
- Consider group educational opportunities that allow members of the diagnostic team to explore cognitive biases and develop solutions together.

In Summary

Although diagnostic errors have many root causes, MedPro malpractice case data show that clinical judgment is the most common contributing factor. The complex nature of clinical reasoning and decision-making makes it vulnerable to various cognitive errors, including

knowledge deficits, faulty heuristics, and affective influences/situativity. These errors can subconsciously lead to lapses in judgment, which in turn can cause diagnostic mistakes.

More research is needed to determine effective approaches for addressing cognitive errors. However, various strategies — such as improving teamwork, increasing cognitive awareness, and using clinical decision support systems, clinical pathways, checklists, and debiasing techniques — show promise. By considering how to implement these strategies in clinical tasks and processes, healthcare providers can take proactive steps toward managing diagnostic risks.

Endnotes

[1] Kienle, G. S., & Kiene, H. (2011, August). Clinical judgment and the medical profession. *Journal of Evaluation in Clinical Practice, 17*(4), 621–627.

[2] National Academies of Sciences, Engineering, and Medicine. (2015). *Improving diagnosis in health care*. Washington, DC: The National Academies Press.

[3] Ibid; Nendaz, M., & Perrier, A. (2012, October). Diagnostic errors and flaws in clinical reasoning: Mechanisms and prevention in practice. *Swiss Medical Weekly, 142:w13706*; Phua, D. H., & Tan, N. C. (2013). Cognitive aspect of diagnostic errors. *Annals of the Academy of Medicine, Singapore, 42*(1), 33–41; Ely, J. W., Graber, M. L., & Crosskerry, P. (2011, March). Checklists to reduce diagnostic errors. *Academic Medicine, 86*(3), 307–313.

[4] National Academies of Science, Engineering, and Medicine, *Improving diagnosis in health care*.

[5] Phua, et al., Cognitive aspect of diagnostic errors; Nendaz, et al., Diagnostic errors and flaws in clinical reasoning; Crosskerry, P., Singhal, G., & Mamede, S. (2013, October). Cognitive debiasing 1: Origins of bias and theory of debiasing. *BMJ Quality & Safety, 22*(Suppl 2), ii58–ii64.

[6] Phua, et al., Cognitive aspect of diagnostic errors; Merkebu, J., Battistone, M., McMains, K., McOwen, K., Witkop, C., Konopasky, A., Torre, D., . . . Durning, S. J. (2020). Situativity: a family of social cognitive theories for understanding clinical reasoning and diagnostic error. *Diagnosis, 7*(3), 169–176. doi: https://doi.org/10.1515/dx-2019-0100

[7] National Academies of Science, Engineering, and Medicine, *Improving diagnosis in health care*.

[8] Nendaz, et al., Diagnostic errors and flaws in clinical reasoning.

[9] Phua, et al. Cognitive aspect of diagnostic errors.

[10] Ibid; Clark, C. (2013, August 27). Physicians' diagnostic overconfidence may be harming patients. *HealthLeaders Media.* Retrieved from www.healthleadersmedia.com/clinical-care/physicians-diagnostic-overconfidence-may-be-harming-patients

[11] National Academies of Science, Engineering, and Medicine, *Improving diagnosis in health care*. Crosskerry, P., Abbass, A. A., & Wu, A. W. (2008, October). How doctors feel: Affective influences in patient's safety. *Lancet, 372*, 1205–1206; Phua, et al. Cognitive aspect of diagnostic errors.

[12] Smith, W., Elkin, D., & Walaszek, A. (2023, October). How to draw on narrative to mitigate ageism. *AMA Journal of Ethics, 25*(10), E745–750. doi: 10.1001/amajethics.2023.745.

[13] Rader, R. (2022, July 27). *Advancing health care equity: Diagnostic overshadowing worsens health disparities.* The Joint Commission. Retrieved from www.jointcommission.org/resources/news-and-multimedia/blogs/advancing-health-care-equity/2022/07/diagnostic-overshadowing-worsens-health-disparities/

[14] Campbell, C. M., & Edwards, R. R. (2012). Ethnic differences in pain and pain management. *Pain Management, 2*(3), 219–230; Drwecki, B. B. (2015, March). Education to identify and combat racial bias in pain treatment. *AMA Journal of Ethics, 17*(3), 221–228; Fassler, J. (2015, October 15). How doctors take women's pain less seriously. *The Atlantic.* Retrieved from www.theatlantic.com/health/archive/2015/10/emergency-room-wait-times-sexism/410515/; Hoffman, D. E., & Tarzian, A. J. (2001). The girl who cried pain: A bias against women in the treatment of pain. *Journal of Law, Medicine, and Ethics, 29,* 13-27.

[15] Crosskerry, et al., How doctors feel: Affective influences in patient's safety.

[16] Merkebu, et al., Situativity: A family of social cognitive theories for understanding clinical reasoning and diagnostic error.

[17] Ely, et al., Checklists to reduce diagnostic errors.

[18] National Academies of Science, Engineering, and Medicine, *Improving diagnosis in health care;* Cascella, L. (2022 [last updated]). *Artificial Intelligence in Healthcare: Challenges and Risks*. MedPro Group. Retrieved from www.medpro.com/challenges-risks-artificial-intelligence

[19] Crosskerry, P. (2003). Cognitive forcing strategies in clinical decisionmaking. *Annals of Emergency Medicine, 41*, 110–120.